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CURRICULUM GUIDE



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A C K N O W L E D G M E N T S

The Department of Education acknowledges with appreciation the contribution of the following Graphics Career Field Ad Hoc Committee members to the preparation of this guide.

VISUAL COMMUNICATIONS CAREER FIELD AD HOC COMMITTEE

- A. A. Day, Department of Education, Edmonton (Chairman)
- D. Broadbent, Western Canada High School, Calgary
- R. Everett, Central Memorial High School, Calgary
- J. Greffen, Bowness Composite High School, Calgary
- D. Hanington, Central Memorial High School, Calgary
- W. Ilchuk, St. Joseph Composite High School, Edmonton
- B. Povaschuk, Harry Ainlay Composite High School, Edmonton
- W. Rohrlack, Harry Ainlay Composite High School, Edmonton
- Dr. J. D. Harder, Department of Education, Curriculum, Edmonton
- J. C. Smith, Department of Education, Calgary (Secretary)

NOTE: This Curriculum Guide is a service publication only. The Senior High School Program of Studies contains the official statement concerning Senior High School Drafting. The information contained in the Guide is prescriptive insofar as it duplicates that contained in the Program of Studies. There are in the Guide, however, as well as content, methods of developing the concepts, suggestions for the use of teaching aids and lists of additional reference books.



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I. INDUSTRIAL EDUCATION

Industrial Education is a program consisting of courses which provide a continuum of experiences, starting with exploratory activities in the junior high school and expanding in the high school to the development of skills related to career fields. This development of the student's skills is planned for through courses in industrial arts and vocational education culminating in on-the-job experience, or entry into a job or post-high school institution for further education.

The program consists of courses ranging from those designed for an exploration of the technologies and trade areas to units of practical preparation for a career. In the process the courses develop the student's knowledge of himself, his talents and his skills.

The Industrial Education course "guides" provide the teacher with an outline of the topics, generalizations and concepts selected as most relevant for the physical and mental development of the students and the logical development of the subject area in accordance with the resources of the school in both teaching personnel and facilities.

The guide leaves much scope for the teacher to develop content related to the topics, especially in writing behavioural objectives describing specific changes in student behaviour anticipated from the learning tasks.

It is expected that each school district will develop a program of Industrial Education appropriate to the fulfilment of the needs of its student clientele.

II. OBJECTIVES

A. Industrial Education Objectives

The general objectives of Industrial Education complement the aims and objectives of the secondary school. The objectives of Industrial Education are:

1. To provide students with the curriculum content designed to develop fundamental tool and procedural skills which help prepare them to enter a family of occupations.
2. To provide students with courses that serve as vehicles which help them relate their academic knowledge to vocational competencies.
3. To provide students the opportunity to develop basic competencies, both academically and in work skills to enter either a job or a post-high school institution for further education.

4. To provide students with the environment whereby they may develop sound attitudes, acceptable work habits, and achieve a feeling of accomplishment.

B. Visual Communications Career Field Objectives.

The Visual Communications career field should provide an opportunity to:

1. Introduce students to the career opportunities and activities in the field of Visual Communications.
2. Enable the students to develop the knowledge, craftsmanship, skills and standard of performance necessary for job entry or entry into post-secondary institutions.
3. To help students develop an awareness of the principles and elements of design and apply these to the various fields of Visual Communication.

C. Major Area of Study Objectives

The specific objectives of the Drafting program are in harmony with the purposes of the Industrial Education Program and are as follows:

The Drafting courses shall provide students with the opportunity to:

1. Learn and work in an environment that enables them to make a realistic assessment of themselves, their interests and aptitudes as they relate to Drafting.
2. Develop habits and attitudes acceptable to the trade concerning safety, working relationships, and efficient use of time and materials.
3. Develop basic competencies in the use of drafting equipment, materials and processes that may be used to gain advanced placement in technical institute programs or on the job.

III. EVALUATION

Evaluation of student growth should be based on stated behavioural changes and specific criteria understood by the students. Allowance should be made for both self and teacher evaluation and in some cases peer evaluation. Evaluation should further be based on the three domains of learning as defined by an Alberta committee of Industrial Education teachers.

Their categories are as follows:

- a. Verbal and Written Communication
- b. Personal Growth
- c. Manipulative Skills.

The weighting given each of the three measures will depend on the nature of the behavior being evaluated. For a more detailed treatment of evaluation see the Industrial Education Handbook.

IV. ORGANIZATION

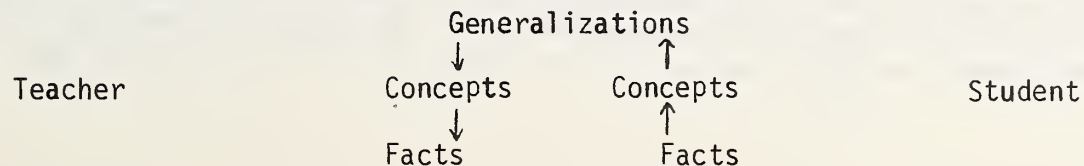
A. Guide Organization

The course guides are developed on the following pattern:

1. Topic: Each course is subdivided into a number of topics.
2. Generalization: The main generalization or "big" idea that students should learn follows each topic.
3. Concepts: The concepts divide the topic into the teaching components. They give more direction on specific areas that should be studied.
4. Behavioral Objectives: These describe specific changes in student behavior which result from learning tasks he performs.

Facts are taken to be items of specific information, concepts are categories of information and generalizations express the relationship between concepts.

In planning a lesson, the teacher moves down this hierarchy whereas in learning, the student begins with facts and moves upward.



5. Suggested Activities: A few suggestions are made as to the types of activities that could be used to achieve the behavioural objectives.

6. Resource Materials: This column suggests where materials may be obtained.

B. Program Organization

1. Program Description

The Drafting modules give students the opportunity to learn the theory and skills necessary in the drafting area. They will learn to identify and use drafting equipment to perform the major techniques and drawing skills. Their activities will range from drawing exercises to complete working drawings of projects. In the process they will learn about the trade, job opportunities, business practices, and enough skills to get a job, go on to further training or enhance their avocational interests.

2. Organization of Majors

The course is divided into six five-credit modules and one of five ten-credits. Entry into the program is through Drafting 12, General Technology 10 or Visual Communications 12. The modules are sequential for the following: 22A prerequisite to 32A, and 32C. 22B is prerequisite to 32B and 32C. The 22A, 22B and 22C modules may be taken immediately following the introductory course.

In addition to the modules set out in the major for Drafting a student may select modules designated as minors. These are normally at the first level (introductory course) of the area, e.g., the module in Building Construction would be Building Construction 12.

A student wishing to meet the requirements of the Institutes must complete all seven modules in the major area.

Some students, however, may take only a few modules in a major area as a supplement to their academic program or they may broaden their selection to other career fields. The scope of the Industrial Education program allows the flexibility necessary for the program to be tailored to meet the interests and needs of the individual class or student.

The chart on page 6 gives a graphic description of the Drafting program. Each module is identified and the sequences are indicated by lines, e.g., after a student has completed one of Drafting 12 or Visual Communications 12 or General Technology 10 he/she may advance to any module to which the solid line leads; in this case, any of 22A, 22B or 22C.

Once a student has enrolled in a "22" or second level course he may also select modules from the minor fields.

Students may find some of the courses in the listed related fields beneficial to their career program development. They are encouraged to take some of these to complement their program.

3. Facility Organization

The organization of the physical facilities is in part determined by the original plan. There are however adjustments that can be made in the layout by the teacher to accommodate his/her style of teaching. The number of students in a class affects the way the lab or shop is organized. While most of the shops in Alberta are designed for 16 to 20 students a number of factors must be considered in the final assignment of class load. These factors include:

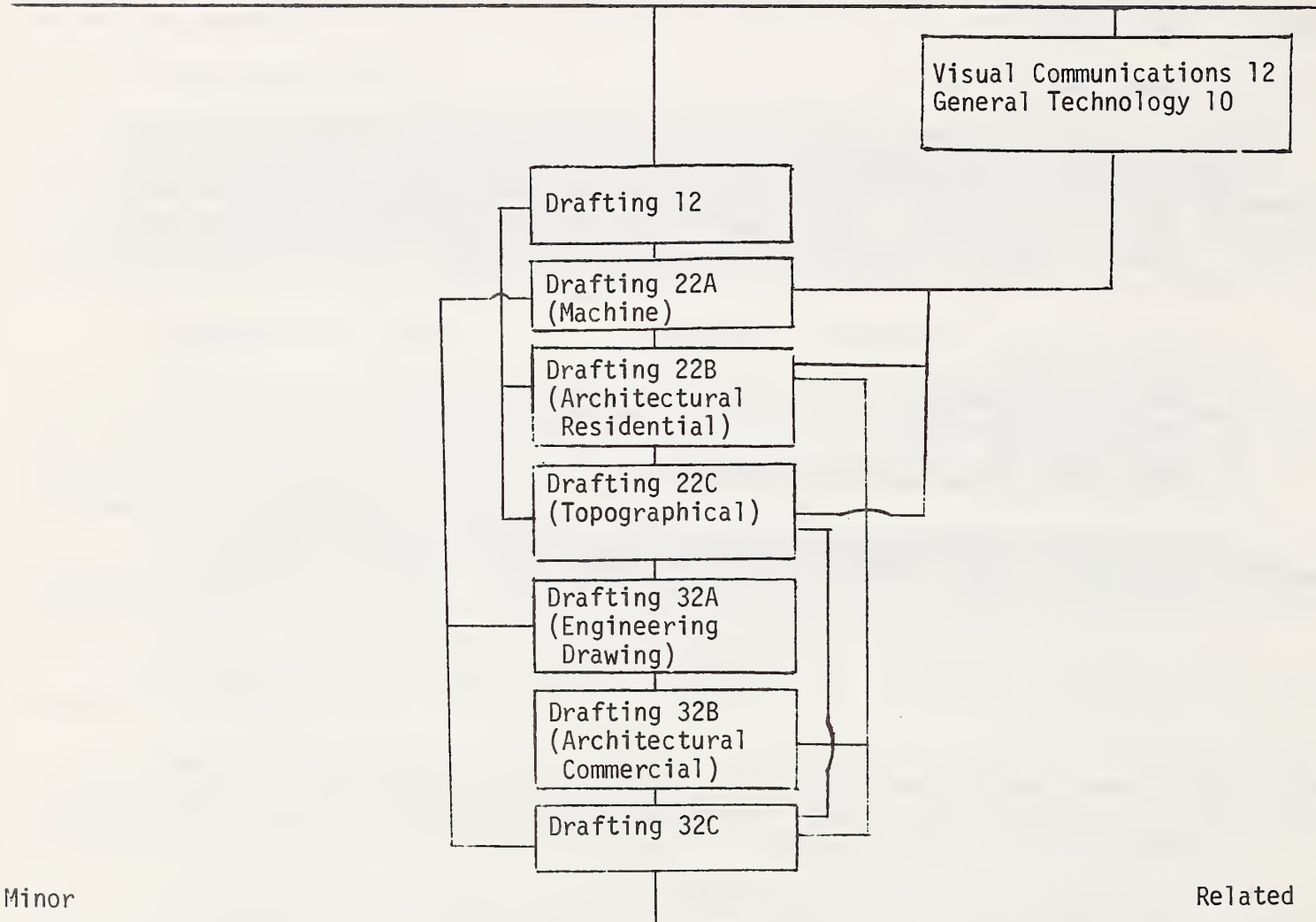
1. physical size of the shop or laboratory
2. type of student
3. amount of equipment
4. type of programming
5. type of course
6. training and experience of the teacher.

Safety of the students and their opportunity to obtain teacher contact are important considerations when class loads are determined.

CAREER FIELD

GRAPHICS

Drafting



Minor

Related

Building Construction
 Machine Shop
 Electricity-Electronics
 Welding
 Sheet Metal

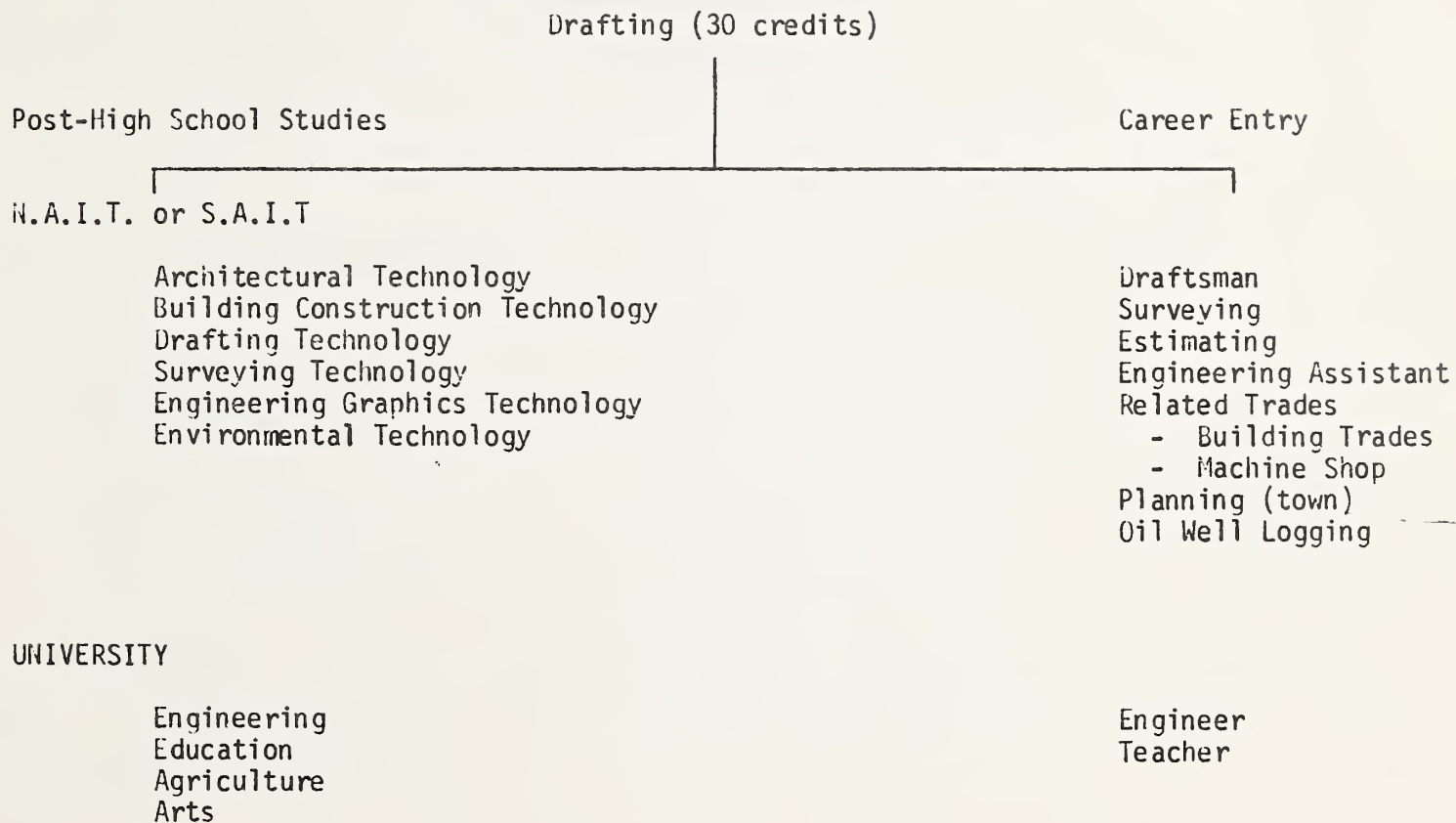
Piping
 Graphic Arts
 Commercial Arts
 Forestry
 Aircraft Maintenance

Industrial Arts
 Business Education
 Work Experience

*or Drafting 10

V. CAREER OPPORTUNITIES

Students taking most or all of the modules in the Drafting major may look forward to the following opportunities:



VI. VISUAL COMMUNICATIONS

1. Drafting 12

INTRODUCTION

This course in drafting is to provide the student with experiences that allow him to sample the various kinds of drawings used within the field generally. These activities should enable him to make an informed decision about further studies in the drafting field.

I. OBJECTIVES

The objectives of Drafting 12 are:

1. To provide a practical environment which will enable a student to make a more realistic assessment of his interests and aptitudes.
2. To allow a student to develop basic knowledge, understanding and appreciation of Drafting processes and materials.

II. CONTENT SUMMARY

1. Drafting equipment
 - use and care
 - materials
2. Shape description
 - line language
 - object representation
3. Lettering
 - Gothic
 - styles
4. Geometry
 - geometric constructions
5. Reproduction of drawing
 - reproduction methods
6. Pictorial drawing
 - oblique
 - perspective
7. Sectional views
 - cutting plane
 - section lines
 - section types

8. Auxiliary views
9. Dimensioning
 - symbols
 - rules
10. Detail drawing
 - complete description
11. Occupational information

III. REFERENCES

No single text is prescribed.

References (Those marked with an * are considered the most useful.)

- * Canadian Standards Association. *Mechanical Drawing Standards*, B 78-1.
- * Davis, E. J., and H. F. Skinner. *New Basic Drafting*. General Publishing Co. Ltd.
- Jensen, C. H., and F. H. Mason. *Drafting Fundamentals*. McGraw-Hill.

IV. CONTENT

Generalizations, concepts and behavioural objectives are outlined on the following pages. Teachers are expected to develop additional behavioural objectives and activities to supplement the identified content and maintain relevancy.

Topic I: DRAFTING EQUIPMENT

Major: Drafting

Generalization A: A knowledge of the use and handling of drafting equipment is basic to the writing of the drafting language.

Course: Drafting 12,

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
<p>1. Care of Instruments</p> <p>2. Use of Instruments</p> <p style="padding-left: 20px;">(i.) basic instruments</p> <p style="padding-left: 20px;">(ii.) specialized equipment</p>		<p>The student will:</p> <p>a. given a basic set of drawing equipment, take care of and be able to adjust equipment in the manner prescribed by acknowledged practice.</p> <p>a. given a basic set of drawing instruments, use the equipment in a manner prescribed by the teacher to draw simple geometric shapes.</p> <p>b. given "specialized" equipment (lettering devices, templates, scales, drop spring bows, contour pens, proportional dividers and others), use the equipment on practice exercises.</p>	<p>Identify and learn to clean and/or adjust drafting equipment.</p> <p>Draw simple geometric shapes, e.g., garden gates, graphs, charts, survey plots, symbols from various fields, simple objects, etc.</p> <p>Practice exercises may include the production of signs, charts, etc. that require the use of specialized equipment.</p>	

Notes:

Generalization

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
3. Drawing media.		The student will: a. given samples of various tracing papers, films, and cloths, correctly identify each type and list the advantages of each.	Discussion. Experiment by drawing on various papers.	

Notes:

Generalization B: A knowledge of shape description is basic to reading and writing the language of drafting.

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
1. Line Language		The student will: a. describe object lines, hidden lines and centre lines as given in the CSA Mechanical Engineering Drawing Standards and tell the purpose of each.	Draw lines noting correct sizes for spaces, dashes, thickness, etc.	
2. Object Representation		a. given multiview, axonometric, oblique and perspective drawings of an object, identify each type by name. b. given partially completed multiview drawings, complete the drawings. c. given pictorial drawings, produce multiview drawings.	Orally discuss methods. Answer test questions. Add missing lines. Sketch and draw multiview drawings.	

Notes:

Generalization D: Drafting geometry is basic to the writing of the language of drafting.

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
1. Geometrical Constructions		<p>The student will:</p> <p>a. given drawing instruments, draw objects which incorporate the following geometrical constructions:</p> <ul style="list-style-type: none"> (i.) draw lines (ii.) draw lines parallel to given lines (iii.) draw lines perpendicular to given lines (iv.) bisect straight and curved lines (v.) divide a line into equal parts (vi.) bisect an angle (vii.) draw a hexagon, an octagon and a pentagon (viii.) draw tangent arcs given various conditions *(ix.) draw an ellipse *(x.) draw other constructions deemed to be necessary to the production of drawings. 		

Notes: *These sections to be omitted from General Technology 10 and from Drafting 12A.

Generalization E: Multiple copies of drawings are often required by industry and are made by various processes.

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
1. Reproduction Methods		<p>The student will:</p> <ol style="list-style-type: none"> a. given a drawing, run prints of it and will be able to describe and identify various kinds of prints available from the diazo process. b. given samples of various kinds of prints, identify each and determine the relative expense of each. <ol style="list-style-type: none"> i. diazo ii. micro-filming iii. multilith iv. photography v. xerox c. given a method of reproduction, describe the process to the class orally or written on a test. 	<p>Tour a reproduction company.</p> <p>Answer test questions.</p> <p>View samples of kinds of prints.</p>	

Notes:

Generalization F: Objects are more realistically presented by means of pictorial drawings.

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
1. Pictorial Drawing (i.) oblique (ii.) perspective (iii.) axonometric		The student will: a. given a multiview drawing of an object, sketch and draw the object using axonometric or oblique projection. b. given an object, make a perspective, freehand sketch of the object.	Make freehand and instrument drawings in axonometric and oblique. Check solutions to multiview problems by making a pictorial sketch.	

Notes:

Generalization G: Interiors of objects, often too complicated to show by the use of hidden lines, are depicted by means of sectional views.

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
<p>1. Cutting Plane</p> <p>2. Section Lines</p> <p>3. Section Types</p> <p style="padding-left: 20px;">(i.) half</p> <p style="padding-left: 20px;">(ii.) full</p>		<p>The student will:</p> <p>a. given two or more views of an object, one in section, locate correctly the cutting plane line and add arrows to show direction of lines of sight and add identifying letters.</p> <p>a. describe the purposes of section lines and identify the symbols for materials specified by the teacher.</p> <p>b. draw full and half sections given two or more views of the object.</p> <p>*c. draw removed, revolved and broken out sections as specified by the teacher.</p>		

Notes: *Omit from Drafting 12A.

Generalization H: Views other than the six basic views of multiview projection are often required to describe shape completely.

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
1. Primary views		The student will: a. given two views of an object with an inclined surface, add the auxiliary view.		

Notes:

Generalization I: Size description is basic to the language of drafting.

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
<p>1. Dimensioning</p> <p>(i.) symbols</p> <p>(ii.) rules</p>		<p>The student will:</p> <p>a. given a dimensional drawing, identify the elements as specified by CSA Mechanical Engineering Drawing Standards clauses 5.4.2. to 5.4.12.</p> <p>b. given an object, select the dimensions required to describe completely the size of the object.</p> <p>c. sketch dimensions onto a given drawing.</p> <p>d. given an object, draw the object giving complete size and shape description.</p>		

Notes:

Generalization

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
		<p>The student will:</p> <ol style="list-style-type: none">a. given an object, determine the views required to describe completely the object and to produce a drawing that is complete, accurate, and dimensioned, correctly showing sectional views, auxiliary views and shop directions where required.		

Notes:

Generalization J: A knowledge of occupational areas will help students plan course work to achieve their vocational goal.

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
<p>1. Course Information</p> <p>2. Vocational Information</p>		<p>The student will:</p> <p>a. given a program of studies, plan his high school program.</p> <p>a. given a realistic appraisal of his characteristics, outline the vocations he would like to prepare for.</p>	<p>Study course descriptions. Visit other classrooms and shop areas.</p> <p>Visit convenient work stations.</p>	

Notes:

VI. VISUAL COMMUNICATIONS

2. Drafting 22A

(Machine Drawing)



INTRODUCTION

Students may advance to 22A after having completed one of Visual Communications 12, General Technology 10, or Drafting 12.

I. OBJECTIVES

The objectives of Drafting 22A are to provide study in:

1. the application of drafting theory and techniques consistent with mechanical drawing standards.
2. fabrication processes
3. materials, their properties and use.

II. CONTENT SUMMARY

1. Introduction to drawing
 - shape description
 - size description
2. Fabrication and construction processes
 - forming processes
 - fastening devices
 - welding symbols
3. Working drawings

III. REFERENCES

Canadian Standards Association. *Mechanical Drawing Standards*, B78-1.

French, T.E., and C. J. Vierch. *A Manual of Engineering Drawing for Students and Draftsmen*. Tenth edition. McGraw-Hill.

Giesecke, F. E., et al. *Technical Drawing*. Fifth edition. Collier-Macmillan of Canada.

Jensen, C. H. *Engineering Drawing and Design*. McGraw-Hill.

IV. CONTENT

Generalizations, concepts and behavioural objectives are outlined on the following pages. Teachers are expected to develop additional behavioural objectives and activities to supplement the identified content and maintain relevancy.

Topic I: INTRODUCTION TO DRAWING

Major: Drafting

Generalization A: Drafting is a standardized means of accurately transmitting ideas and information necessary for the fabrication and construction of machines and mechanical systems.

Course: Drafting 22A
Machine Drawing

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
<p>1. Drafting Techniques</p> <p>(i.) shape description</p>		<p>The student will:</p> <p>a. given the problem of communicating technical information about a machine or part, select the most suitable type or projection and draw the required views conforming to standard drafting practice as outlined in <i>Mechanical Drawing Standards</i>.</p> <p>b. given a machine or part having a complex interior, correctly show the interior using sectional views following the standard conventional practice.</p> <p>c. given machine parts with inclined or oblique surfaces, draw auxillary views to completely describe the shape of the part.</p>	<p>Draw objects best suited for:</p> <ol style="list-style-type: none"> 1. orthographic projection <ul style="list-style-type: none"> - multiview - axonometric (isometric) 2. oblique <ul style="list-style-type: none"> - cabinet - cavalier 3. perspective. <p>Draw parts suited to half, full, revolved, offset and removed sections and involve ribs, webs, and spokes.</p> <p>Draw normal orthographic views plus a partial primary auxiliary view of inclined surfaces.</p>	

Notes:

Generalization

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
<p>2. Fabrication and Construction</p> <p>(ii.) size description</p> <p>(i.) forming processes</p>		<p>The student will:</p> <p>a. given a machine or part, correctly draw the views required to describe the shape and completely dimension the part following all the rules of selection, placement, and drawing of dimensions.</p> <p>b. given a machine drawing, place limiting dimensions as required and give finishes where necessary.</p> <p>a. given a forming process, describe the process in an oral or written report, listing advantages and disadvantages of that process.</p> <p>b. given a machine or part to be manufactured, select a manufacturing method and correctly draw the machine or part giving the notes and dimensions as dictated by that process.</p>	<p>Draw and dimension parts giving notes, shop directions, specifications, etc.</p> <p>Write about various machining processes, casting processes, or forging processes.</p> <p>Draw and dimension objects to be cast or machined, giving fillets and rounds, tolerances, drill sizes, etc.</p>	

Generalization

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
(ii.) fastening - threaded fasteners - mechanical fasteners		The student will: c. given a machine or part which incorporates threads and threaded fasteners, correctly draw the machine or part using the appropriate thread symbol correctly and will add the proper thread notation and specification. d. list some uses, be able to represent graphically and specify correctly each of the following types of fasteners: (i.) keys (square, flat, gib head, splines, Pratt and Whitney, Woodruff) (ii.) machine pins (taper, dowel clevis, cotter) (iii.) rivets (tubular, semitubular, split, compression).	Draw and dimension machine parts with external and internal threads of coarse and fine series and also include bolts, cad screws, studs, machine screws, set screws. Use both schematic and simplified symbols. Draw machines and parts which incorporate mechanical fasteners.	

Notes:

Generalization

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
<p>- welding</p> <p>3. Working Drawings</p>		<p>The student will:</p> <p>e. given a machine part that is to be fabricated by welding, correctly draw and dimension the part showing the proper welding symbols and parts list with specifications.</p> <p>a. given a simple machine, draw complete detail drawings with shape and size description and shop notes and specifications where required. He will also include an assembly drawing and bill of materials correctly lettered and laid out with borders, title blocks, etc., in the manner of a professionally done drawing.</p> <p>b. given his working drawings, make a whiteprint of each sheet.</p>	<p>Draw parts which have butt, corner, tee, lap and edge joints and which include bead, fillet plug or slot, square bevel "U", "V" and "J" welds.</p> <p>Do working drawings of paper punches, clamps, vises, etc., which incorporate as many of the preceding concepts as is possible.</p> <p>Make various kinds of prints using the equipment available.</p>	<p>Giesecke, et al. Chapter 25</p>

Notes:

VI. VISUAL COMMUNICATIONS

3. Drafting 22B

(Architectural Drawing, Residential)



INTRODUCTION

This is the first course in architectural drawing and may be selected following the completion of one of the following introductory courses: Visual Communications 12, General Technology 10, or Drafting 12.

I. OBJECTIVES

1. Familiarize the student with the properties, uses, advantages and disadvantages of the common structural materials - wood, steel, and reinforced concrete.
2. Accustom the student to using manuals and manufacturer's catalogues to select suitable load bearing members and finish materials.
3. Familiarize the student with basic construction theory as applied to wood frame, steel and reinforced concrete.
4. Introduce students to architectural drawing practices by having them draw a variety of typical details, sections, plans, and elevations involving wood, steel and concrete construction.

II. CONTENT SUMMARY

1. Architectural drawing
 - drawing standards
2. Planning and design
 - floor plans
 - elevations
 - orientation
3. Structural systems
4. Working drawings
 - set of working drawings.

III. REFERENCES

- CMHC. *Canadian Wood Frame House Construction.*
- CMHC. *Choosing a House Design.*
- * Canadian Government Specifications Board. *Architectural Drawing Practices.*
- Goodban and Mayslett. *Architectural Drawing and Planning.*
- * Hepler and Wallach. *Architectural Drafting and Design.* McGraw-Hill.
- Hornung. *Architectural Drafting.* Prentice-Hall.
- National Research Council. *Residential Standards - Canada.*
- Smith. *Materials of Construction.* McGraw-Hill.
- Spence. *Architecture Design Engineering Drawing.* McKnight and McKnight.
- Stegman and Stegman. *Architectural Drafting.* American Technical Society.
- * Most useful.

IV. COURSE CONTENT

Generalizations, concepts and behavioural objectives are outlined on the following pages. Teachers are expected to develop additional behavioural objectives and activities to supplement the identified content and maintain relevancy.

Topic I: ARCHITECTURAL DRAWING

Major: Drafting

Generalization A: Architectural drawing is the standardized means of accurately transmitting and recording ideas and information necessary for the planning and erection of structures.

Course: Drafting 22B
Architectural
Drawing, Residential

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
1. Drafting Practices		The student will: a. correctly execute lines, symbols, lettering notes, abbreviations and dimensions as dictated by standard architectural drafting practices.	Practice sheets.	
2. Planning and Design (i.) floor plans		a. given a floor plan, analyze the traffic patterns, size and relative location of rooms, entry halls, etc., following the guidelines set in <i>Choosing a House Design</i> .	Written evaluation, oral discussion - read <i>Choosing a House Design</i> .	
(ii.) elevations		b. given elevations of two houses, compare the elevations using criteria set down by good design practices.	Written evaluation - sketch the given house with an improved elevation.	
(iii.) orientation		c. given a drawing of a lot, orient a house on the lot, considering prevailing wind, sun's path, view, elevations of lot and other factors.	Draw or sketch a house on a plot plan.	

Notes:

Generalization

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
<p>(iv.) preliminary studies</p> <p>(v.) presentation of designs</p>		<p>The student will:</p> <p>d. given the housing requirements of a family that has a lot, design a house to meet the requirements given and draw preliminary sketches of the floor plan, two elevations, plot plan, structural details and special features.</p> <p>e. given his own preliminary studies, draw the residence in perspective and add foreground, middle ground and background to give the residence an appropriate setting which will best represent his design.</p> <p>f. given his preliminary studies, build as a home assignment a scale model of the proposed residence which shows the details of landscaping and construction adequately to test his design and to show the client his design solution.</p>	<p>Do freehand preliminary sketches of a solution to a housing problem.</p> <p>Draw the exterior in one- or two-point perspective and add trees, clouds, hills, cars or people.</p> <p>Sketch a one- or two-point perspective of some interior detail of the residence.</p> <p>Finish a scale model at home after a start in class.</p>	

Notes:

Generalization

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
3. Structural Systems		<p>The student will:</p> <ol style="list-style-type: none"> a. given a method of house construction, sketch or draw with instruments a typical wall section through that kind of house and label all members of the construction. b. given a construction material, describe the structure, composition, physical and mechanical properties in a written or oral report. c. given structural members, describe how the members are fastened and sketch the members in position, showing the method used to fasten them together. d. given tables in <i>Residential Standards</i> and <i>Canadian Wood Frame House Construction</i>, select columns, beams, joists and trusses for a specific residence. 	<p>Draw and sketch wall sections through post and beam, wood frame, solid masonry, brick, veneer construction.</p> <p>Describe the properties of wood, plywood, yard lumber, concrete.</p> <p>Draw and sketch joist to foundation framing; roof truss and gang nails or gussets; column footing beam and joist connection with hangers, etc.</p> <p>Design structural members.</p>	

Notes:

Generalization

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
		<p>The student will:</p> <p>e. given a particular climate, soil type, and house plan, select a method of house construction that best solves the problem.</p>	<p>Select a method suited to California on hard rock for a house with an open plan and no basement, etc.</p> <p>Tour convenient houses under construction.</p>	

Notes:

Topic I: ARCHITECTURAL DRAWING (Continued)Generalization

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
3. Structural Systems		<p>The student will:</p> <ol style="list-style-type: none"> a. given a method of house construction, sketch or draw with instruments a typical wall section through that kind of house and label all members of the construction. b. given a construction material, describe the structure, composition, physical and mechanical properties in a written or oral report. c. given structural members, describe how the members are fastened and sketch the members in position, showing the method used to fasten them together. d. given tables in <i>Residential Standards</i> and <i>Canadian Wood Frame House Construction</i>, select columns, beams, joists and trusses for a specific residence. 	<p>Draw and sketch wall sections through post and beam, wood frame, solid masonry, brick, veneer construction.</p> <p>Describe the properties of wood, plywood, yard lumber, concrete.</p> <p>Draw and sketch joist to foundation framing; roof truss and gang nails or gussets; column footing beam and joist connection with hangers, etc.</p> <p>Design structural members.</p>	

Notes:

Generalization

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
		<p>The student will:</p> <p>e. given a particular climate, soil type, and house plan, select a method of house construction that best solves the problem.</p>	<p>Select a method suited to California on hard rock for a house with an open plan and no basement, etc.</p> <p>Tour convenient houses under construction.</p>	

Generalization

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
4. Working Drawings		<p>The student will:</p> <p>a. given preliminary drawings of a house of his own design (or a selected design), draw a set of working drawings which include floor plans, elevations, structural section, plot plan, basement plan, stair and chimney details and room schedules that conform to the standards of IIRC "Residential Standards" and accepted architectural drafting practices.</p>	<p>Draw a set of working drawings for a residence.</p>	

Notes:

VI. VISUAL COMMUNICATIONS

4. Drafting 22C

(Topographical Drawing)



INTRODUCTION

Students may select topographical drawing following one of the introductory courses; Drafting 12, Visual Communications 12 or General Technology 10.

I. OBJECTIVES

The objectives of Drafting 22C are:

1. To provide experience in the interpretation and production of topographical charts and maps.
2. To provide students with opportunities to work with and become competent in using a variety of tools and equipment used in topographical work.

II. CONTENT SUMMARY

1. Data gathering
 - surveying
 - photogrammetry
2. Interpretation
 - field notes
 - air photos
3. Geographical data
 - direction
 - location
 - relief
 - physical and cultural features
4. Symbolic Representations
 - scale
 - special drawing equipment
 - lettering
 - symbols
 - map projections.



III. REFERENCES

- Atlas of Alberta.* (School Book Branch, Department of Education - \$13.00).
- Baldock, E. D. *Map Production.* Information Canada.
- Bartholomew, John. *The Times' Atlas of the World.* London: The Times. \$45.00.
- Boggs. *Maps - How to Read and Interpret Them.* \$2.00.
- Bygott, John. *Introduction to Mapwork and Practical Geography.* University Tutorial Press. \$8.00.
- *Chevrier. *Topographic Map and Air Photo Interpretation.* Macmillan. \$5.20.
- *Department of Mines and Resources, Ottawa. *Every Square Inch.* \$1.50.
- Dickinson, G. *Maps and Air Photographs.* Macmillan. \$7.95.
- Edward, Bennison. *Introduction to Geological Structures and Maps.* Second edition. London: Arnold Publishing. (Toronto: Macmillan). \$1.90.
- *Most useful.
- Gopsil, G. *Practical Geography.* Macmillan. \$5.00.
- Greenhood, David. *Mapping.* University of Toronto Press. \$2.95.
- Maps and Diagrams.* University Paperbacks. London: Monkhouse and Wilkinson. \$1.75.
- Marsh. *All About Maps and Map Making.* Random House. \$3.00.
- Minshall, Roger. *Landforms from the Air.* Macmillan. \$1.65.
- Raisz, E. *Principles of Cartography.* McGraw-Hill. \$9.28.

Roblin, H. S. *Map Projections*. Macmillan. \$1.85.

*Sloane and Montz. *Elements of Topographical Drawing*. McGraw-Hill. \$8.35.

Supplement to the Manual of Instruction for Survey of Canada Lands. Ottawa: Queen's Printer. \$3.00.

Basic Student Reference - Non-Print Materials

Source "The Experience Group", 4041 West 36th Avenue, Vancouver 13, British Columbia.

EG Representative Topographic Maps of Canada, book of 10 pkgs., \$8.50.

EG302 Structured Pictures of North America, \$11.50.

Alberta Township Plans, each - \$0.50.

Alberta Government Map, 1" = 16 miles.

Topographical Maps (Federal), Scale 1:50,000, Ottawa: Queen's Printer, each - \$1.00.

Topographical Maps, Scale 1:25,000, Ottawa: Queen's Printer, each - \$1.00.

Air Photographs, Ottawa, each - \$0.50.

*Most useful.

IV. CONTENT

Generalizations, concepts and behavioural objectives are outlined on the following pages. Teachers are expected to develop additional behavioural objectives and activities to supplement the identified content and maintain relevancy.

Topic I: TOPOGRAPHIC DRAWING

Major: Drafting

Generalization A: Topographic drawing is the interpretation and translation of geographic data into an accurate, permanent scaled symbolic record of the features.

Course: Drafting 32C
Topographical
Drawing

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
<p>1. Gathering Data</p> <p>(i.) surveying</p>		<p>The student will:</p> <p>a. given the requirements for the use of a map, list the features to be shown and discuss the accuracy desirable in locating these features for the use of the map maker.</p> <p>b. given a topographic map, compile a list of all features shown on the map.</p> <p>c. given a 100 ft. steel tape, chain a staked area.</p> <p>d. given a transit, range pole and level rod:</p> <p>(1.) set up transit</p> <p>(ii.) level it</p> <p>(iii.) plumb to a point on the ground.</p>	<p>Examine maps from <i>Every Square Inch</i>. List the features shown.</p> <p>Measure distances, check by re-measure. Find sine of $\frac{1}{2}$ angle for angular measurements.</p>	

Notes:

Generalization

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
		<p>The student will:</p> <p>d. (iv.) give angular readings from the horizontal</p> <p>(v.) give horizontal readings between points on the ground</p> <p>(vi.) find the elevations of a series of points in reference to a bench mark.</p> <p>e. given a transit, tape and range pole, survey a given area and record all the information complete with sketch, date, name of surveyors, location and description of survey, distances, angles, elevations and all calculations.</p>		

Notes:

Generalization

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
<p>2. Interpretation</p> <p>(i.) field notes</p> <p>(ii.) photogrammetry</p>		<p>The student will:</p> <p>a. given complete survey field notes, make a scale drawing of the survey following the notes and mathematically calculate the corrections for closure.</p> <p>b. given air photos and transparent film, use the photos to transfer topographical information to a map grid of the same area.</p> <p>c. given air photos, plan a local subdivision for housing or industry, taking advantage of existing roads, power lines, drainage, and view lots.</p> <p>d. given air photos, stereoscope and ink equipment, draw in relief by using such symbols as hachures or line shading.</p> <p>e. given aerial photographs, topographic maps and paper mache, produce a scale model of a given area showing relief, rivers, lakes, vegetation, etc.</p>	<p>Draw the survey recorded in the field.</p> <p>Draw contours, given elevation data.</p> <p>Draw a map of the proposed plan.</p> <p>Build an accurate model with all features properly color coded.</p>	

Notes:

Generalization

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
B. Geographical Data (i.) direction (ii.) location		<p>The student will:</p> <p>a. given a map of a specific location and a drafting machine or protractor, calculate angular readings from a given point to other given points.</p> <p>b. given a magnetic compass, a map of the area and the magnetic declination, plot a true north line on the map.</p> <p>c. given a map with latitude and longitude, locate a given feature and properly record the location in degrees, minutes and seconds of latitude and longitude.</p> <p>d. using dividers and scales, set up a latitude-longitude grid on a given map and place these minute divisions around the border in graphic form.</p>	<p>Locate features relative to the school.</p> <p>Define:</p> <ol style="list-style-type: none"> 1. Azimuth 2. Magnetic North 3. True North 4. Grid North. <p>Locate true north on given maps. Locate magnetic polar area on map of Canada.</p> <p>Record the location of the school or other feature using suitable published maps.</p>	

Notes:

Topic I: TOPOGRAPHIC DRAWING (Continued)Generalization

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
(iii.) relief		<p>The student will:</p> <ul style="list-style-type: none"> e. given a simple road map that has a grid layout, locate a given point from coordinates. f. given a map of Alberta, locate a given feature by giving the Section, Township, Range and Meridian in the correct order. g. given the required equipment, draw a typical (3rd system of survey) township plot giving all the section numbers, legal subdivision numbers and road allowances. h. given a road map and topographic maps, plan a road trip or hike that would avoid steep grades yet go through picturesque country. Consider forestation, density, lakes, muskeg, etc. i. given published topographical maps, calculate the gradient of given roads and railway lines. 	Review of the 3rd system of survey.	

Notes:

Generalization

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
		<p>j. given published maps with structured contours, produce a cross-sectional drawing to scale through an given line of section.</p> <p>k. given points of elevation place structure contours on a map and be able to interpret these contours.</p>		

Generalization

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
<p>(iv.) physical and cultural features</p> <p>4. Symbolic Representations</p> <p>(i.) scale</p>		<p>The student will:</p> <p>j. given published topographical maps, identify all the features shown making use of the legend and other sources to aid in their map reading.</p> <p>a. using the National Topographical scale ratios, select the proper measuring stick to calculate distances in feet, yards, or miles from 1:25000, 1:50000, 1:63360.</p> <p>b. using a Civil Engineers Scale use scale ratios for any measurement and draw a city or town lot plan to scale on a linear sheet.</p> <p>c. using ink equipment, draw any graphic scale as open divided.</p>	<p>Oral discussion of maps on view. Written quizzes on specific maps.</p> <p>Design and draw a graphic scale for a plot plan.</p>	<p><i>Every Square Inch</i></p>

Notes:

Generalization

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
(ii.) drawing equipment		<p>The student will:</p> <p>d. given ruling pens, gauge pens, compass, reservoir pens and contour pens, complete ink drawings with the aid of irregular curves and straight edges.</p>	<p>Draw a city or town lot plan with buildings. Draw geometrical designs.</p> <p>Examine or use "scribing film" and scribing equipment.</p>	
(iii.) lettering		<p>e. given a mechanical lettering set and a prepared map, letter on the names of rivers, lakes, towns, etc., following these criteria:</p> <p>(i.) larger letter size for large or important features</p> <p>(ii.) words read from the bottom or right side</p> <p>(iii.) names of rivers conform to river shapes and are on the north side where possible</p> <p>(iv.) names of cities, towns, etc., are placed on the right side so names do not cross.</p>	<p>Examine and experiment with "stick-ons" and "rub-ons" such as those by Letraset.</p> <p>Practice sheets of free-hand lettering. Use mechanical lettering devices.</p>	

Notes:

Generalization

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
(iv.) symbols		<p>The student will:</p> <ul style="list-style-type: none"> f. using ink equipment, draw the common map symbols. g. given colored crayons and solvent, points, dyes, or air brush, correctly color code the symbols shown on a diazo print of a map. h. using inking equipment, use the following methods of illustrating relief: <ul style="list-style-type: none"> (i.) line shading (ii.) hachures (iii.) contour line (iv.) layer tinting (color density). 		

Notes:

Generalization

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
(v.) map projections		<p>The student will:</p> <ol style="list-style-type: none"> 1. given the proper data and equipment, produce a map by following these ordered guidelines: <ol style="list-style-type: none"> (i.) pencil a grid (ii.) pencil topographic features (iii.) ink all lettering (iv.) ink physical and cultural features (v.) ink grid lines. a. given a map of Canada, draw the U.T.M. zones and give the zone which covers a given location. b. describe the universal Transverse Mercator Method of projection. 		

Notes:

VI. VISUAL COMMUNICATIONS

4. Drafting 32A

(Engineering Graphics)



INTRODUCTION

Engineering graphics develops the concepts in machine drawing introduced in Drafting 22A with an emphasis on the designing of systems and calculating specifications of the components.

I. OBJECTIVES

The objectives of Drafting 32A are:

To provide in-depth study in:

- (a) the application of drafting theory and techniques consistent with mechanical engineering drawing standards.
- (b) fabrication processes.
- (c) materials, their properties and uses.

II. CONTENT SUMMARY

1. Engineering graphics
 - the graphic language
2. Views
 - orthographic
 - oblique
 - perspective
3. Problem solving
 - descriptive geometry
 - revolutions
 - developments and intersections
 - vector geometry
4. Industrial systems
 - piping
 - power transmission systems
 - fluid power
5. Working drawings
 - simple machine



III. REFERENCES

- French, T.E. and C.J. Vierch. *Graphic Science: Engineering Drawing, Descriptive Geometry Graphic Solution*. McGraw-Hill, 1970.
- French, T.E. and C.J. Vierch. *A Manual of Engineering Drawing for Students and Draftsmen*. Fifth edition. McGraw-Hill.
- Giachino, J.W. and H.J. Beukema. *Engineering-Technical Drafting and Graphics*. General Publishing Co. Ltd.
- Giachino, J.W. and H.J. Beukema. *Engineering-Technical Drafting and Graphics, Study Guide 2*. General Publishing Co. Ltd., 1967.
- Giesecke, F.E. et al. *Technical Drawing*. Fifth edition. Collier-Macmillan Canada, Ltd.
- * Jensen, C.H. *Engineering Drawing and Design*. McGraw-Hill, 1968.
- * Lusadder. *Basic Graphics*. Prentice-Hall.
- * Most Useful.

IV. CONTENT

Generalizations, concepts and behavioural objectives are outlined on the following pages. Teachers are expected to develop additional behavioural objectives and activities to supplement the identified content and maintain relevancy.

Topic I: ENGINEERING GRAPHICS

Major: Drafting

Generalization A: Engineering Graphics is a universal graphic language used to solve problems of engineering design, to express ideas, and supply information required for the fabrication and construction of mechanical systems.

Course: Drafting 32A
Engineering Graphics

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
1. The Graphic Language		<p>The student will:</p> <p>a. given the problem of drawing a machine or part, be capable of drawing the part in any of the following projections:</p> <p>(i.) orthographic - multiview - axonometric - isometric - dimetric - trimetric</p> <p>(ii.) oblique - cavalier - cabinet</p> <p>(iii.) perspective - one-point - two-point - three-point.</p>	<p>Draw machines, machine parts, and objects of various shapes.</p>	

Notes:

Generalization

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
		<p>The student will:</p> <ul style="list-style-type: none"> b. given a machine or part with a complex interior, show the appropriate views in section to best describe the shape of the object and draw the sectional view using all the rules and conventions of accepted drafting practice. c. given an object with inclined or oblique surfaces, find the true size and shape of these surfaces by adding the required auxiliary views to the basic views of orthographic multiview projection and follow the step-by-step procedure as laid down in drafting reference books. d. given a machine or part, correctly draw the views required to describe the shape and completely dimension the part following the rules of selection, placement and drawing of dimensions as set out by the Canadian Standards Association. 	<p>Draw objects that require primary and secondary auxiliary views.</p>	

Notes:

Generalization

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
		<p>The student will:</p> <ul style="list-style-type: none"> b. given a machine or part with a complex interior, show the appropriate views in section to best describe the shape of the object and draw the sectional view using all the rules and conventions of accepted drafting practice. c. given an object with inclined or oblique surfaces, find the true size and shape of these surfaces by adding the required auxiliary views to the basic views of orthographic multiview projection and follow the step-by-step procedure as laid down in drafting reference books. d. given a machine or part, correctly draw the views required to describe the shape and completely dimension the part following the rules of selection, placement and drawing of dimensions as set out by the Canadian Standards Association. 	<p>Draw objects that require primary and secondary auxiliary views.</p>	

Notes:

Generalization

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
2. Problem Solving (i.) descriptive geometry		The student will: a. given two or more views of a line, determine the true length of the line by applying the basic principles of orthographic projection. b. given two or more views of two skewed lines, determine the shortest distance between them. c. given two or more views of a plane, find the edge view of the plane and the true shape of the plane. d. given two or more views of a plane, determine the angle between the line and the plane. e. find the dihedral angle between two intersecting oblique planes. f. given a line which passes through a plane, find the piercing point of the plane.	Determine true length when the line is vertical, horizontal, inclined, or oblique. Complete given drawing to find the distance.	

Notes:

Generalization

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
(ii.) revolutions		<p>The student will:</p> <p>g. given two or more views of an object, re-draw the views revolving one or more of the views in a specified manner.</p> <p>h. given an object with an oblique surface, determine the true shape of the surface by revolution.</p>	<p>Draw simple revolutions of given normal views.</p>	
(iii.) developments and inter-sections		<p>i. given objects from the list below, lay out the complete surface of the object.</p> <p>(i.) prisms of all shapes</p> <p>(ii.) pyramid</p> <p>(iii.) cone</p> <p>(iv.) cylinder</p> <p>(v.) oblique prism</p> <p>(vi.) truncated cone</p> <p>(vii.) transition pieces</p>	<p>Draw layouts.</p> <p>Construct objects from cardboard.</p>	

Notes:

Generalization

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
(iv.) vector geometry		<p>The student will:</p> <p>j. given two intersecting surfaces, find the line that is common to them both</p> <p style="padding-left: 40px;">(i.) in problems involving plane surfaces.</p> <p style="padding-left: 40px;">(ii.) in problems involving two surfaces that are single curved or double curved.</p> <p>k. given two or more forces, determine the direction and magnitude of the resultant force.</p> <p>l. given three or more forces, determine the resultant force.</p> <p>m. given a force, resolve this force into two or more components of a given direction.</p> <p>n. given two forces, determine the equilibrant.</p>	<p>Find the line of intersection.</p> <p>Graphically solve written problems.</p> <p style="text-align: center;">"</p> <p style="text-align: center;">"</p> <p style="text-align: center;">"</p>	

Notes:

Generalization

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
<p>- belts and chains</p> <p>(iii.) fluid power</p>		<p>The student will:</p> <p>e. given the requirements of a machine with oscillating motion, draw the displacement diagram and determine the cam profile required to give the follower a specific motion.</p> <p>f. given a power driven machine with a power source of a set speed and a desired driven speed, determine the best method of power transfer (belts or chains) and indicate the relative size of the pulleys or sprockets.</p> <p>g. given a drawing of a hydraulic power system, color code the circuits.</p>	<p>List advantages of chain and belt drives. Investigate methods of adjusting power and speed of driven shaft.</p> <p>Written report on types of belts and chains with added diagrams. View kinds of belts and chains; view various machines, e.g., engine lathe, drill press, etc.</p> <p>Color circuits which extend and retract the piston.</p> <p>Draw graphical diagrams showing when piston is</p> <ol style="list-style-type: none"> 1. extending 2. retracting. 	

Notes:

Generalization

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
4. Working Drawings		<p>The student will:</p> <ul style="list-style-type: none"> a. given a simple machine, draw the detail and assembly drawings required to completely describe the machine with all required shop directions, dimensions, notes and bills of materials drawn and lettered in a manner consistent with drafting practices outlined by the C.S.A. b. given his working drawings, make whiteprints of each sheet. c. produce a working drawing using the metric system. 	<p>Do working drawings of a worm gear jack, hydraulically operated clamp, trolley, winch, etc. Assign on an individual basis considering level of difficulty, time, student's ability, etc.</p> <p>Operate the dry-print copier.</p>	

Notes:

VI. VISUAL COMMUNICATIONS

5. Drafting 32B

(Architectural Drawing, Commercial)



INTRODUCTION

Drafting 32B is an advanced course in Architectural Drawing and students must have completed drafting 22B before taking 32B.

I. OBJECTIVES

The objectives of Drafting 32B are:

1. to have the student produce working drawings of a standard that would be acceptable in the building construction industry.
2. to introduce the student to the four different areas of drafting within the broad field of building construction drafting. (i.e. architectural, structural steel, reinforced concrete, and structural timber drafting.)

II. CONTENT SUMMARY

1. Drafting Practices
 - house plans
2. Planning and design
 - light commercial facilities
 - presentation designs
3. Structural systems
 - materials
 - construction details
 - fastening methods
 - steel
 - reinforced concrete
4. Working drawings



III. REFERENCES

- American Concrete Institute. *Manual of Standard Practice for Detailing Reinforced Concrete Structures.*
- American Institute of Steel Construction. *Manual of Steel Construction.*
- American Institute of Steel Construction. *Structural Shop Drafting, Volumes 1 & 2.*
- Building Construction Handbook.* McGraw-Hill.
- Canadian Government Specifications Board. *Architectural Drawing Practices.*
- Canadian Institute of Steel Construction. *Elementary Structural Shop Drafting.*
- Canadian Institute of Timber Construction. *Timber Construction Manual.*
- Goodban and Hayslett. *Architectural Drawing and Planning.*
- Harperin. *Building With Steel.* American Technical Society.
- *Hepler and Wallach. *Architectural Drafting and Design.* McGraw-Hill.
- Hornung. *Architectural Drafting.* Prentice-Hall.
- Lincoln Electric. *Procedure Handbook of Arc Welding Design and Practice.*
- Smith. *Materials of Construction.* McGraw-Hill.
- Spence. *Architecture Design Engineering Drawing.* McKnight and McKnight.
- Stegman and Stegman. *Architectural Drafting.* American Technical Society.
- Timber Design and Construction Handbook.* McGraw-Hill.

*Most useful.

IV. CONTENT

Generalizations, concepts and behavioural objectives are outlined on the following pages. Teachers are expected to develop additional behavioural objectives and activities to supplement the identified content and maintain relevancy.

Topic I: ARCHITECTURAL DRAWING

Major: Drafting

Generalization A: Architectural Drawing is the standardized means of accurately transmitting ideas and information necessary for the planning and erection of structures.

Course: Drafting 32B
Architectural
Drawing, Commercial

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
1. Drafting Practices		The student will:		
		a. given a simple house, draw plans, sections, elevations and details in accordance with specifications in <i>Architectural Drawing Practices</i> .	Draw specific plans with dimensions, title blocks, notes, etc., laid out in an approved manner.	Canadian Government Specifications Board publications
2. Planning and Design				
(i.) light commercial facilities		a. given the appropriate reference material and the requirements, plan a building to meet the needs of the client and to satisfy the basic elements of good design.	Do preliminary sketches of a shoe store, barber shop, or other "one man operations". Sketch plot plan, floor plan, elevations.	
(ii.) presentation of designs		b. given a simple commercial building, make a two-point or one-point perspective of it.	Draw or sketch school in perspective. Do a perspective rendering following preliminary designs of light commercial building.	
		c. given a simple merchandising facility, sketch the interior in one- or two-point perspective.	Draw display area or shelf space.	

Notes:

Generalization

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
<p>3. Structural Systems</p> <p>(i.) materials</p> <p>(ii.) construction details</p> <p>(iii.) fastening structural members</p> <p>- timber</p>		<p>The student will:</p> <p>a. given a structural material, describe in a written or oral report the structure, composition, physical and mechanical properties of that material.</p> <p>b. given a structure of wood, steel, or concrete, draw or sketch standard construction details for the various members in that structure.</p> <p>c. given a typical joint in timber construction, select nails, screws, bolts, glue, or ring connectors best suited to transfer the load from one member to another and will sketch or draw joint.</p>	<p>Written or oral reports on:</p> <ol style="list-style-type: none"> 1. timber 2. steel 3. concrete 4. reinforced concrete 5. finish material. <p>Draw or sketch details for timber, steel and concrete as found in timber and steel construction manuals and in reinforced concrete manuals.</p> <p>Sketch trusses, beam and post connections, joist and beam connections, foundation buttresses, three-hinged arches, etc.</p>	

Notes:

Topic I: ARCHITECTURAL DRAWING (Continued)Generalization

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
- steel		<p>The student will:</p> <p>d. given a problem from a reference text, draw complete working drawings for timber beams, columns and trusses showing framing, connection and hardware details, with the correct information as found in timber construction manuals.</p> <p>e. given a bolted steel connection, determine the function of the bolts and describe the types, sizes and properties required of these bolts.</p> <p>f. given an erection drawing or engineering drawings, refer to a steel construction manual to select suitable connectors and draw detail shop drawings or structural members.</p> <p>g. given a type of weld, sketch that weld and draw the standard symbol for that weld.</p>	<p>Give written or oral report on connections where bolts are in shear, bearing and tension.</p> <p>Draw detail shop drawings of beams, columns, trusses and braces.</p>	

Notes:

Generalization

Concept and Sub-Concepts	Approx. Time	Behavioural Objectives	Activities or Jobs	Resources
<p>4. Working Drawings</p> <p>- reinforced concrete</p>		<p>The student will:</p> <ul style="list-style-type: none"> h. given a set of erection drawings, draw detail shop drawings of a beam, a column, a truss, or a cross bracing with welded connections. i. describe the use of bar supports to ensure the correct location of reinforcing steel in concrete members. j. given a simple structure and reinforcing concrete manual, draw the required placing drawings, and make bar bending lists for the reinforcing steel. a. given preliminary sketches of a small commercial building with a pre-planned interior arrangement, exterior, and structural system, form a "team" with three or four other students, to simulate drawing office organization (with a "chief draftsman" to delegate and co-ordinate jobs and to appoint checkers) which will draw part of the working drawings required. 	<p>Oral and written reports with sketches.</p> <p>Do placing drawings and bar bending lists for a simple structure selected from a reference text.</p> <p>Various students draw plot plan, basement plan, floor plans, door and window details, exterior elevations, sections, construction details, framing plans, schedules and specifications, etc.</p> <p>Visit a convenient drawing office.</p> <p>View examples of working drawings.</p>	

Notes:

VI. VISUAL COMMUNICATIONS

3. Drafting 32C

(Related Technology, Work Study or
In-depth Study)

DRAFTING 32C

The last module of the Drafting sequence is open to students who have completed 30 credits or six modules in the major.

The 125 hours of instruction time available in this module may be used to:

- a. Provide greater depth to a module taken previously. Individual students, groups of students or whole classes may elect to study an area in more detail.
- b. Engage in actual Drafting supervised by the Drafting teacher as a coordinator and a competent person on the job.
- c. Take instruction in a related field such as Building Construction or Machine Shop.

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